Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

The determination of sex.—In a recent paper on the determination of sex, STRASBURGER[12] adds to his already extensive contributions to this difficult subject. As in previous papers, he maintains that the problem is phylogenetic, and that there is a striking parallelism between the animal and plant kingdoms in the evolution of sex. In both kingdoms the original differentiation appears only in the haploid generation, but with the differentiation of sex in this generation came fertilization and the formation of a diploid generation, which, in both animals and plants, became the dominant one.

The point at which the separation of sexes takes place in various plant groups is noted briefly; the statements, in most cases, depending upon facts already known, rather than upon cytological or other evidence in connection with this particular paper.

In monoecious Chlorophyceae the thallus is bisexual and the sexes are separated at the formation of oogonia and antheridia; at fertilization the two sexes are united; the reduction of chromosomes takes place during the first two divisions of the zygote, but is not accompanied by any separation of sexes, the product of the zygote being bisexual. In dioecious Chlorophyceae the separation of sexes occurs at the reduction division, so that the products of the zygote are unisexual. Thus the separation of sex tendencies appeared first in connection with the reduction divisions.

In monoecious bryophytes there is no separation of sexes at the reduction divisions, the separation occurring later, at the formation of antheridia and archegonia; but in dioecious forms the separation occurs at the reduction division. That the separation of sex tendencies as well as their union at fertilization is decisive, is shown by the fact that protonema from vegetative cells of a sporophyte of a dioecious moss produces leafy plants bearing both antheridia and archegonia.

In homosporous pteridophytes there is no separation of sexes at the reduction divisions, the spores being bisexual and the sex tendencies being separated later in the gametophytes arising from the spores. The division which many homosporous pteridophytes show in their gametophytes is due merely to external factors, the gametophytes being really monoecious. In heterosporous forms the separation of sexes does not occur at the reduction divisions, but much earlier, during the divisions leading to the formation of spore mother cells, so that the spore mother cells are already all male or all female, all the spores of a microsporangium producing male prothallia and all those of a megasporangium producing female prothallia. The two sex tendencies are united in the sporophyte, which can then produce both microsporangia and megasporangia. Through the heterospory of the sporophyte the dioecism of the gametophyte became firmly established.

In seed plants the sexes are recognized by the external "sex organs" of the diploid sporophyte. In heterosporous plants there is no sex differentiation except that which leads to the formation of microspores and megaspores, for from a microspore mother cell come four spores which produce only male products, and from a megaspore mother cell come four spores which produce only female products. If all sporophytes were bisexual, the problem would be comparatively simple, but there are sporophytes which produce only microsporangia or only megasporangia, and these dioecious seed plants, although their number is comparatively small, have been used extensively in the study of sex problems.

---

[12] STRASBURGER, EDUARD, Ueber geschlechtbestimmende Ursachen. Jahrb. Wiss. Bot. **48**:427–520. *pls. 9, 10.* 1910.

A large amount of experimental work is recorded, the principal forms used being *Mercurialis annua*, *Melandrium rubrum*, and *Elodea canadensis*.

In *Mercurialis annua* ovulate plants sometimes bear occasional staminate flowers, and similarly, staminate plants sometimes bear occasional ovulate flowers. STRASBURGER had already found that the flowers of an ovulate plant, when pollinated from a staminate flower on the same plant, bore seeds which produced only ovulate plants. He now finds that the scattered ovulate flowers on a staminate plant, when pollinated from the same plant, bear seeds which produce only staminate plants. Some plants have ovulate flowers with staminate flowers growing up through them in a sort of proliferation. Pollination of such ovulate flowers with pollen of the proliferating flowers gives rise to seeds which produce both ovulate and staminate plants. The conclusion is that in the scattered staminate flowers the male tendency has become weakened, and that in the scattered ovulate flowers, the female tendency has become weakened.

In the dioecious *Melandrium rubrum*, pollination was effected by pollinating with thin transverse sections of still unopened anthers. It was hoped that in this way pollination would be effected with about equal numbers of pollen grains with the stronger and with the weaker male tendencies. In all, 1475 seeds were secured, and from these there were obtained 1124 seedlings, 1035 of which reached the flowering stage. Of these 376 were staminate and 659 ovulate, the ovulate being strongly dominant.

The work on *Elodea canadensis* is interesting, but is still in an unfinished condition. Although ovulate plants have long been abundant in Europe, staminate plants are not available. Staminate plants and seeds were secured from Wolf Lake, near Chicago, and hundreds of stigmas were pollinated, each with a single pollen tetrad. Fertilization has taken place, but seeds are not yet ripe. If each ovary should produce four seeds, two of which should produce staminate plants and two ovulate plants, there would be some definite data.

The general conclusion from the data, only a small part of which has been indicated here, is that all eggs are female and all pollen male, but that some pollen has a strong and some a weak male tendency. Pollen with a strong male tendency overcomes the female tendency of the egg, while pollen with the weak male tendency is overcome by the stronger female tendency of the egg. The fact that eggs of apogamous forms may produce staminate as well as ovulate plants does not affect the problem, since such eggs are diploid, and the sex tendencies have not yet been separated. The case is similar to that of budding.

A cytological study was made in *Melandrium rubrum*, *Cannabis sativa*, and *Mercurialis annua*, but at present no cytological features have been recognized which seem to have any bearing upon the problem of the separation of the sexes. In *Melandrium rubrum* one chromosome is constantly larger than the others, as was noted during the reduction divisions and in vegetative cells, but it could not be connected with sex differentiation.

The problem is unusually large and difficult, and the present paper suggests many points of attack.—CHARLES J. CHAMBERLAIN.

Crown gall.—The most noteworthy contribution recently made to plant pathology is the bulletin on crown gall of plants by SMITH, BROWN, and TOWNSEND.[13] This disease, on account of its wide distribution and the conspicuous nature of the deformations to which it owes its name, has long attracted the attention both of practical horticulturists and plant pathologists. Yet, with the exception of the work of some Italian investigators, little has been done to work out the etiology of the disease. From general observations it has been believed that the disease is communicable, and one investigator (CAVARA) isolated an organism from a gall of the European grape and established a strong probability that it was the causal organism of that particular gall. The nature of the outgrowths known as crown gall and occurring on a great many different kinds of plants, the cause of their occurrence, and the relation of the crown galls of different plants to each other, have remained among the most obscure problems in the whole field of plant pathology. The results of investigations on these problems are reported in the present bulletin.

The work begins with a short historical sketch of the more important investigations on the crown gall, special emphasis being laid on the work of Italian investigators who first ascribed the disease to bacteria. This is followed by an account of the isolation of the causal organism, and the evidence showing that the crown gall of various plants is due to bacterial organisms; and that these belong either to a single species or to closely related species or strains, each of which can be inoculated into many species of plants. The morphology and cultural characteristics of the organism (*Bacterium tumefaciens* Smith and Townsend) are described at length. Further, the similarity between crown gall and some animal tumors is discussed. This similarity is emphasized by the occurrence of metastases in infected plants. The last part of the bulletin relates to the practical aspects of the subject, together with a statement of the plants infected and their distribution. The evidence given in the first part is supported by 36 excellent plates.

---

[13] SMITH, E. F., BROWN, NELLIE A., TOWNSEND, C. O., Crown gall of plants; its cause and remedy. Bur. Pl. Ind. Bull. **213**: pp. 200. *pls. 36. figs. 3.* 1911.